Rejections under 35 USC § 112, second paragraph

Claims 17-27 stand rejected for indefiniteness under 35 USC § 112, second paragraph.

Regarding alleged lack of definiteness of the claims for recitation of "or a homologue of" applicants respectfully submit that the present claims specify "functional homologues" of M3 which can block binding of the chemokine to the receptor. The application clearly describes how to obtain homologues of M3 and also how to test them to confirm that they are "functional homologues" (see the specification at page 1, line 29 to page 2, line 12). Hence, the metes and bounds of the claimed homologues would be readily understood by the skilled person and they could obtain them without any undue experimentation. Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 20 has been amended to specify "RANTES". Claim 20 has also been amended to specify "secondary lymphoid tissue chemokine SLC" this chemokine is also known as exodus-2 (as mentioned in the application at page 10, lines 6-7).

Claim 21 has been canceled, rendering the rejection of this claim moot.

Rejections under 35 USC § 102(a)

Claims 17-27 were rejected under 35 USC § 102 (a) as allegedly being anticipated by Parry et al. (Journal of Experimental Medicine (2000) 191 (3): 573-578).

Applicants note that Parry et al. was published on 7 February 2000. The present application was filed on July 17, 2001, but claims priority to Great Britain Application No. GB9916703, filed July 16, 1999. Thus Perry et al is not prior art. Reconsideration and withdrawal of the rejection is respectfully requested.

Attached hereto is a marked up version of the changes made to the specification and claims by the current amendment.

CONCLUSION

Applicants submit that the claims are now in condition for allowance. If any minor matters remain to be discussed, the Examiner is invited to call the undersigned at the telephone number listed below.

Respectfully submitted,

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Marked-up Version of Amended Claims and Specification
Pursuant to 37 C.F.R. §§ 1.121(b)-(c)

In the claims:

Claim 21 has been deleted without prejudice.

Claims 17 and 20 has been amended without prejudice as follows:

17. (Amended) A method of blocking binding of a chemokine to a receptor for the chemokine on the surface of a cell, comprising

contacting the cell with a M3 protein, or a functional homologue thereof, thereby blocking the binding of the chemokine to the receptor.

20. (Amended) The method of claim 17, wherein the chemokine is lymphotactin, (RNATES] RANTES, MIP-1-alpha, MCP-1, MCP-4, IL-8, murine KC, murine MIP2, human GCP2, human IP10, [or] fractaline, murine LIX, MIP-1 or secondary lymphoid tissue chemokine SLC.

The following new claim has been added:

28. (New) The method of claim 17, wherein the M3 protein, or homologue is a coupled protein.

In the specification:

Attached are amended pages 1 and 2 of the specification.

VIRAL PROTEIN BINDING COMPOSITIONS AND METHODS

Field of the Invention:

This invention relates to the use of viral proteins and analogues thereof as binding partners for immune system components and analogues thereof, and to related compositions and methods, for example pharmaceutical compositions and methods, and detection or assay reagents and kits and methods.

Background of the Invention:

Among known herpesvirus proteins is a protein encoded by gene M3 of murine gammaherpesvirus 68 (MHV68) (V van Berkel et al: J Virol 73(5) (1999) pp 4524-4529).

Protein M3 of MHV68 has been reported to be a secreted protein. it has been suggested that this protein may modulate the host immune response to infection by the virus.

The present invention arises from a new finding of particular binding properties of M3 protein of MHV68.

Brief Description of the Drawings

Figure 1 is a set of auto-radiographs of SDS-PAGE analysis, with molecular masses in kDa, from experiments in which soluble chemokine binding activity is produced by MHV68.

Figure 2 is an auto-radiograph of another SDS-PAGE analysis from an experiment to show binding specificity of the soluble chemokine binding protein encoded by the MHV68 M3 ORF.

Figure 3 is a graph showing binding of [125I] RANTES to test (U937) cells in the presence of different amounts of MHV68-infected cell supernatants expressed as cell equivalents.

Figure 4 is a set of two graphs (4 (a) and 4 (b)) showing binding of MIP-1 alpha and IL-8 to U937 cells respectively.

Figure 5 is an auto-radiograph of SDS-PAGE analysis experiments involving binding of M3 to MIP-1 alpha and IL-8 respectively.

Figure 6 is a graph showing results of inhibition experiments with M3, cultured cells and RANTES and demonstrates that M3 inhibits RANTES induced calcium flux in human PBMCs in a dose dependent manner.

Figure 7 is a set of two graphs (7(a) and 7(b)). Graph 7(a) shows that M3 inhibits MCP-1 induced migration of THP-1 cells, and graph 7 (b) shows that M3 inhibits IL-8 induced migration of neutrophils.

Figure 8 is a graph showing results of in-vivo experiments for the effect of M3 on inflammatory responses in mice.

Summary and Description of the Invention:

According to an aspect of the present invention, M3 protein and its functional homologues, including derivatives, and fragments, can be used to bind chemokines of the immune system and their analogues, and to block binding of chemokines to corresponding cell surface receptors. M3 can for example act as a useful immunosuppressant. Details of these binding effects of M3 protein are described herein below.

Homologues of M3 protein can be obtained, e.g. by mutation of an M3-encoding nucelotide sequence and expression from the mutated sequence, and/or by use or derivation from related gene sequences, e.g. from herpesvirus from Crocidura russula (Bowden, 1997, Cambridge University PhD thesis and Chastel et al, Acta Virologica 1994 38:309). Alternatively, they can be obtained, e.g. by identifying gene sequences homologous to M3 by screening databases containing either protein sequences or nucleotide sequences